

Flaked Glass Tools from the Andaman Islands and Australia



ZARINE COOPER AND SANDRA BOWDLER

BETWEEN THE FIFTEENTH AND NINETEENTH CENTURIES, Europeans colonized many parts of the world that were already occupied by other people. Many of the previous landholders were people using stone-based technology. In the longer term, they were generally unable to hold their land in the face of invasion by people with metal and gunpowder technology. In the shorter term, however, there was often a period during which the indigenous people maintained their traditional lifestyle, but adapted elements of the new culture to its pursuance. One example of such adaptation is the use of glass to produce tools of a kind previously made out of stone by means of percussion, a technique known as flaking or knapping. Flaked glass artifacts dating to a period of culture contact between stone-flaking cultures and glass-producing cultures have been recorded in several countries.

In this paper we discuss examples from the Andaman Islands and Western Australia to show how cultures with no historical relationship but a similar technological base made similar adaptive uses of a new material. While these examples are drawn from societies that survived into recent historical times with hunter-gatherer economies, it is possible that any culture with a knapping technology could have made similar adaptations.

PROBLEMS OF IDENTIFICATION

There is a problem in the identification of flaked glass artifacts, as noted by Beaumont (1961) for South Africa. As he and earlier writers whom he cites point out, physical characteristics identical with those derived from human trimming are easily produced on fractured glass by accidental means. A curved piece of glass (or porcelain) on a reasonably hard surface that is trodden on by humans or cattle, or driven over with a car, will fracture in such a way as to produce these effects. Beaumont recommends that apparently flaked pieces of glass should not be accepted as deliberately produced artifacts unless "strong circumstances or evidence indicates that trimming by vehicles, humans [presumably accidentally] or

Zarine Cooper is with the Project for Indian Cultural Studies, Bombay; Sandra Bowdler is Professor of Archaeology at the University of Western Australia, Perth.

Asian Perspectives, Vol. 37, No. 1, © 1998 by University of Hawai'i Press.

animals or other fortuitous means was inoperative, as, for instance, in a sealed cave deposit." He then discusses three specimens that "do not rely on secondary preparation for their claim to authenticity," whatever that may mean; in fact, the acceptance of these specimens appears to be entirely subjective.

The problem has been tackled more recently by Allen and Jones (1980) in Tasmania, drawing on Allen's earlier research at the abandoned European settlement of Port Essington in northern Australia (Allen 1969, 1973). While arguing that it seems impossible to produce a set of criteria that can positively identify "any single genuine artefact from a fortuitously flaked and shaped non-artefact," they do suggest some guidelines based on Allen's analysis. These are based on the use of nineteenth-century bottles as a source of flaking material, and are summarized as follows: (1) the amount of [bottle] wall attached to the base; (2) the use of thicker parts of bottles; (3) the presence in a collection of a high percentage of identifiable struck flakes; and (4) an analysis of bifacial versus internal and external unifacial flaking on the lower parts of the wall, when this was attached to a base or part of a base.

Like Beaumont, they also take into account the immediate environment in which putative artifacts are found: "the location of the objects coupled with commonsense still provided the best guide to validity" (Allen and Jones 1980: 231).

Australia

Australia was first settled by the British in 1788, with settlement spreading across eastern Australia from Port Jackson (modern Sydney) after that date and from Hobart Town in Van Diemen's Land (now Tasmania) after 1803. The first British settlement in the west of the continent was at King George's Sound (Albany) in 1827, and on the Swan River (Perth) in 1829. Thus bottle glass became available to Aboriginal people in the southern part of Australia from the end of the eighteenth century. There are many ethnohistoric references to the use of glass by Aboriginal people, but few are specific as to the nature of the glass used, the mode of manufacture, or the shape of the final implement. Many of these references would seem to suggest that unworked glass fragments or simple flakes were often employed for traditional purposes (e.g., Backhouse 1843: 103, 433; Plomley 1966: 59, 61, 67; see also Gould et al. 1971: 166). One point of interest that might be noted here is references to glass implements being carried and used by Aboriginal women in Tasmania and South Australia, which might reflect a similar pre-contact use of stone artifacts (Freeman 1993: 31, 33; Plomley 1966: 384).

In northwestern Australia, glass and also porcelain from telegraph insulators were made into bifacial projectile points known as Kimberley points (Balfour 1903). These are highly finished, pressure-flaked items, which were hafted on spears, and many examples are known in Australian museums and those in other parts of the world. These implements are unusual with respect to flaked glass artifacts elsewhere in Australia, as they are clearly identifiable as artifactual, whether hafted or not. We are not aware of other examples of composite tools including a flaked glass component.

Archaeological specimens of glass artifacts have been described from several other areas of Australia, but not all have been readily accepted. Tindale (1941) illustrates a convincing specimen found in Tasmania in 1938 (see below), but it

must be said that the mode of employment he attributes to it is entirely hypothetical. The context of its discovery seems quite unknown. A large collection of putative flaked glass implements from Singleton, to the north of Sydney in New South Wales, was described by McCarthy and Davidson in 1943. A subsequent collection was made from the same site by Davidson with Allen in 1967, and Allen and Jones "throw doubt on the authenticity of the entire Singleton collection" (1980: 231).

Allen's (1969, 1973) study of glass artifacts from Port Essington is mentioned above. His data derived from two sources, first the settlement itself, which is dated between A.D. 1838 and 1849. His second sample was excavated from stratified contexts in nearby Aboriginal middens. The examples discussed by Allen and Jones (1980) came from Oyster Cove, the site south of Hobart where Tasmanian Aboriginal people were institutionalized from 1847 until 1869. Archaeological investigation of their prior place of incarceration, Wybalenna on Flinders Island in Bass Strait, has also been carried out. This site was occupied from 1835 until 1847. Birmingham (1992: 121) records several "well-formed cores" and modified flakes, but they are neither further described nor illustrated. Glass flakes have also been recovered during the archaeological investigation of a similar institution in Victoria, the Lake Condah Aboriginal Mission, which was founded in 1867 (Rhodes and Stocks 1985).

A recent study features a large sample of artifacts excavated from nineteenth century Aboriginal campsites along the Ongkaparinga River estuary, on the Adelaide Plains, South Australia. Europeans first established a whaling station at the mouth of the Ongkaparinga River between 1841 and 1843, and this was soon followed by pastoral settlement (Freeman 1993). This material has been studied in some detail, and will be referred to further.

The Andamans

In 1858, after the establishment of the British penal settlement at Port Blair, glass bottles became easily available to the Andaman Islanders. The thick bases of beer and wine bottles formed ideal substitutes for stone flakes, and it is not uncommon to find glass pieces scattered on the surface of shell middens (Cooper 1990a: 80).

It seems that the "thinner portions" of bottles were never selected for the purpose of making flakes (Man 1883: 380).

The bottom of a bottle is treated in every way as though it were a quartz pebble, a flake being knocked off and used, and then another and so on till the operation in hand (whether shaving or scarifying) is completed. The flake is held between the thumb and first finger when it is being used. In no case is a flake of quartz or glass ever kept. It is only made when required and after having been used is thrown away (Radcliffe Brown 1922: 445).

An earlier observation by the French explorer Lapicque supports this description, as follows.

... the flake (after detachment from a piece of glass) is about the size of a finger-nail and has a round and extremely sharp edge. One holds the flake in the right hand, at the bulb of percussion, and uses it to give two or three shaving cuts, after which the edge becomes quite blunt. The flake is then discarded and a new one is removed from the piece of glass (Lapicque 1894: 368; passage trans. by Z. Cooper).

Scarification and shaving were generally carried out by the women, although only some of them undertook the more difficult task of tattooing (Man 1883: 380). Chips of quartz and chert were formerly used for these activities, but it was soon discovered that glass flakes were sharper and more effective.

Glass lost its importance in the economy of the Andaman Islanders after 1947, when plastic and aluminum containers and metal implements became more easily available. This is shown by Cooper's (1994) study of abandoned Onge encampments in South Bay, Little Andaman Island. Discarded glass bottles (formerly containing oil or other substances) littered these sites, but none of the bottles had been used for the manufacture of artifacts. Moreover, observations of activities in occupied camps yielded no evidence to that effect.

ARCHAEOLOGICAL EXAMPLES FROM THE ANDAMAN ISLANDS AND WESTERN AUSTRALIA

Andaman Island sites containing glass are most numerous around Port Blair and the places where the so-called homes of the Andamanese were established. For example, Lapicque (1894:364) noted bases of glass bottles among other objects in an abandoned encampment in South Andaman. Although the "homes" no longer stand, the beaches of Ross Island, which overlooks Port Blair and was once the headquarters of the British penal settlement, are strewn with colorful pieces of glass rubbed smooth by abrasion. Most of these have resulted from natural breakage, although some may have ended up on shell middens, not only for cutting purposes, but also perhaps for their aesthetic value. In view of this, it was necessary to exercise caution in reporting such material, especially since some middens around Port Blair were contributed by Burmese convicts. Therefore, the sites described here have been selected because of their distance from Port Blair, and only those that have been carefully examined and sampled by Cooper are discussed here.

Cipriani's (Cipriani 1966:75) excavation of the midden near Beehive Hill, on Middle Andaman Island, had yielded five human burials, besides pottery and flakes of what he mistook as obsidian. In 1986, Cooper conducted a careful search of the surface of the midden as well as of the exposed sections, but she did not find any obsidian splinters, though pieces of glass and stone flakes were fairly abundant (Cooper 1990b:100). Furthermore, it may be noted that there is no source of obsidian in the Andamans.

Among the glass artifacts collected from the midden at Beehive Hill, there are eight flakes and twenty chips (Cooper 1987:172). Seven of the flakes are of green glass and one is of white. A few of them are partially flaked. The chips are all of green glass.

Two glass pieces that bear evidence of working were recovered by Cooper (1987:166) from the surface of a site near Lakhimpur in North Andaman Island and from a midden on Swamp Island in Austen Strait (Figs. 1, 2). The piece from Lakhimpur has a convex surface that has been flaked partly to form a sharp edge. The glass flake from Swamp Island is roughly diamond-shaped and is flaked along the edges on the dorsal surface. The ventral side, along the straight edge, is also flaked.

Examples of glass artifacts have also been reported from the Indian sub-

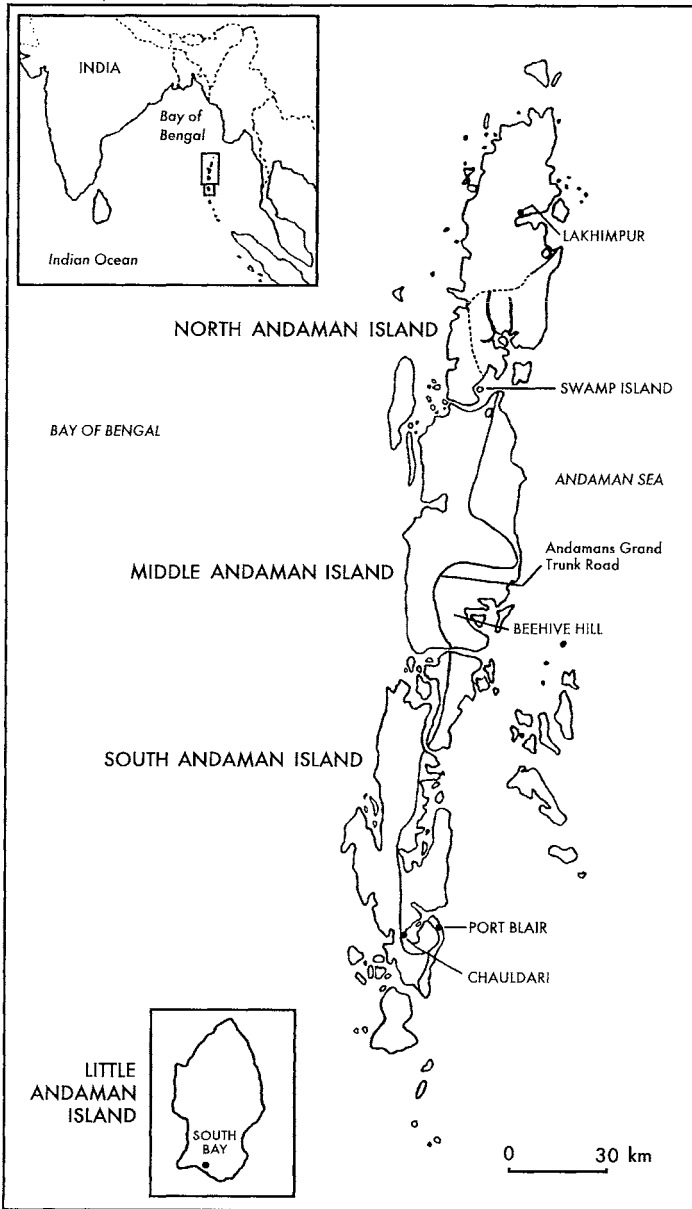


Fig. 1. Map of Andaman Islands.

continent. A core from the base of a molded beer-bottle has been reported from a surface collection at Talaechamet (along the Mahableshwar-Mahad road). The earliest date for such a bottle is seventeenth/eighteenth century A.D., and it is considered to indicate a late survival of a microlithic industry. "The villagers and the local people, in Mahableshwar, confirm this by recalling that these microlithic sites were at one time the camping sites of tribal people. The industry is geo-

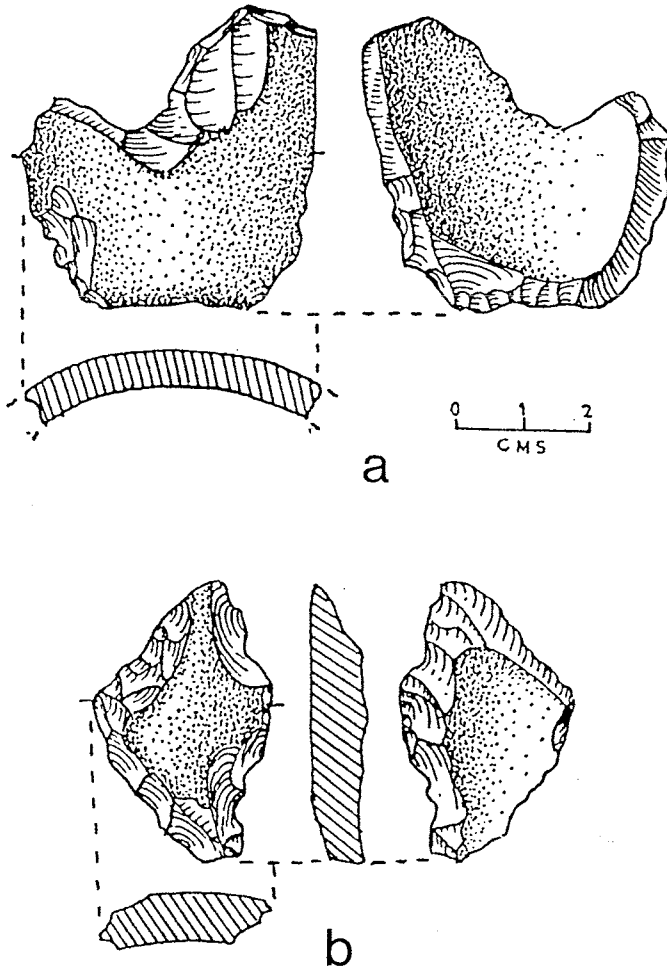


Fig. 2. *a*: Flaked glass piece from Lakhimpur, North Andaman Island.
b: Glass flake from Swamp Island, Austen Strait, Andaman Islands.

metric in character..." (Malik 1959:50). In another instance, geometric microliths made of chalcedony, jasper, and sometimes of bottle glass were found in the rock shelters of Adamgarh, Central India (Khatri 1964:759). No pottery was found in association with the microliths, thus confirming the persistence of a foraging economy in isolated areas, contemporaneous with urban settlements in the adjoining valleys.

In examining the Australian specimens, it is interesting that they display the flaking technique described for the Andamans, although no such description is known from Australia. The Tasmanian specimen described by Tindale, Allen's Port Essington samples, and those from the Ongkaparinga estuary all display similar characteristics. According to Freeman (1993:91), these include a preference for stronger, thicker glass associated with curves and corners, and especially the parts of the base of the bottle where the glass is thickest (push-up, kick-up, and

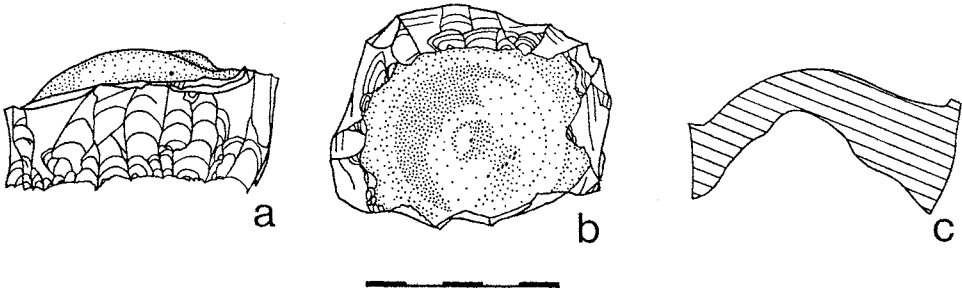


Fig. 3. Base of historic bottle found near Woodstock, northwestern Western Australia, used as a core for the production of glass flakes. *a*: side view showing flake scars; *b*: base; *c*: cross section. Scale 5 cm.

insweep). The most common edge angle recorded is 60–90°, with the next most common angle being 30–60°. The most common edge shapes are, in order of descending frequency, beak, convex, concave, and straight. Straight edges are most often 25–30 mm long and show signs of utilization, with evident flake damage with few striations. There are high proportions of both retouched and utilized edges. Some edge shapes correlate with particular artifact size ranges. For example, concave edges are commonly 35–40 mm long, while straight edges are often 25–30 mm long.

It is evident from the Australian literature that cores made on bottle bases are more reliable indicators of human flaking than isolated flakes or other pieces of glass, as they usually preserve evidence of a number of flakes having been removed. Such cores are unmistakable, given the number and regularity of flakes detached.

The specimens illustrated here are bottle bases that have been used as cores. Specimen 1 (Fig. 3) is from the collections of the Western Australian Museum, and was found near Woodstock in the Pilbara region of northwestern Australia. Specimens 2 and 3 (Figs. 4 and 5) are from Shark Bay, somewhat further to the south, the most westerly part of the Australian continent. They are from surface sites at Cape Lesueur and Monkey Mia, respectively, which are both localities well documented as early pearling sites (Sally McGann, personal communication). The Australian pearling industry began at Shark Bay in the 1860s, and Aboriginal men

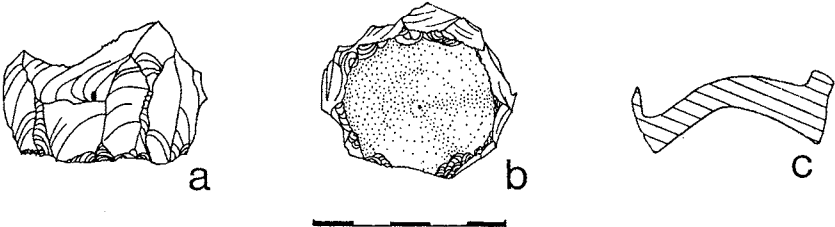


Fig. 4. Base of historic bottle from Monkey Mia, Shark Bay, Western Australia, used as a core for the production of glass flakes. *a*: side view showing flake scars; *b*: base; *c*: cross section. Scale 5 cm.

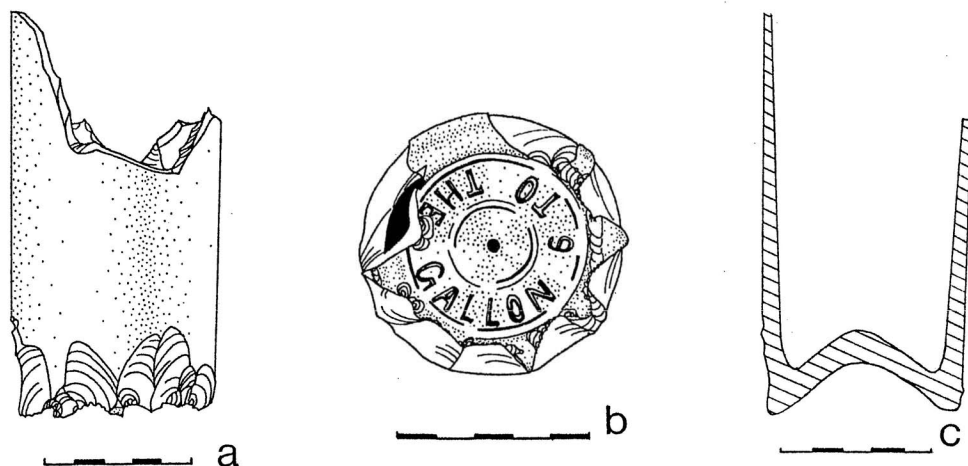


Fig. 5. Base of historic bottle from Cape Lesueur, Shark Bay, Western Australia, used as a core for the production of glass flakes. *a*: side view showing flake scars; *b*: base; *c*: cross section. Scales: *a*, *b*, and *c*: 5 cm.

worked on the cutters, the small yachts used for dredging pearlshell (Bowdler 1990). The bottles from which they are made are common late nineteenth century beer or wine bottles. Specimen 1 is from a dark green, machine-made bottle probably made after 1880 for wine; Specimen 2 is from a black bottle hand made sometime between 1820 and 1920, probably for beer; and Specimen 3 is from a handmade black bottle probably made for wine sometime after 1880 (Martin Gibbs, personal communication).

Other glass items that are believed to be flakes have been collected from these sites in Western Australia, but their identification as knapped artifacts is generally dubious, due at least in part to the lack of other modification. Recent research has tackled this problem more systematically (Harrison 1996).

DISCUSSION

What is interesting about this material is the way that the technological processes recorded from the Andaman Islands describe exactly archaeological specimens from very widely separated parts of Australia, namely the extreme north, the extreme west, and the extreme southeast. Obviously this is not to imply any kind of cultural connection. What it would seem to illustrate is that there are fundamental processes involved in flaking (knapping) behavior, and that people familiar with these will react similarly when new materials are made available to them. Perhaps future, more extensive collections might allow more detailed technological comparative studies.

ACKNOWLEDGMENTS

SB would like to thank Sally McGann for Figures 3–5 and for information, Martin Gibbs for bottle identification, and Sean Freeman for allowing the use of his unpublished dissertation.

REFERENCES

- ALLEN, F. J.
 1969 Archaeology and the History of Port Essington. Ph.D. thesis. Australian National University, Canberra.
 1973 The archaeology of nineteenth-century British imperialism: An Australian case study. *World Archaeology* 5: 44–60.
- ALLEN, JIM, AND RHYS JONES
 1980 Oyster Cove: Archaeological traces of the last Tasmanians and notes on the criteria for the authentication of flaked glass artefacts. *Papers and Proceedings of the Royal Society of Tasmania* 114: 225–233.
- BACKHOUSE, JAMES
 1843 *A Narrative of a Visit to the Australian Colonies*. London: Hamilton, Adams.
- BALFOUR, H.
 1903 On the methods employed by the natives of N.W. Australia in the manufacture of glass spear heads. *Man* 1(5): 65.
- BEAUMONT, P.
 1961 The problem of glass implements. *Bulletin of the South African Museums Association* 7(8): 161–163.
- BIRMINGHAM, JUDY
 1992 *Wybalenna: The Archaeology of Cultural Accommodation in Nineteenth Century Tasmania*. Sydney: Australian Society for Historical Archaeology.
- BOWDLER, SANDRA
 1990 Before Dirk Hartog: Prehistoric archaeological research in Shark Bay, Western Australia. *Australian Archaeology* 30: 46–57.
- CIPRIANI, L.
 1966 *The Andaman Islanders*. London: Weidenfeld and Nicolson.
- COOPER, Z.
 1987 *A Report of Archaeological Investigations in the Andaman Islands from 1984 to 1986*. Report to the Homi Bhabha Fellowships Council, Bombay.
 1990a Archaeological evidence for resource exploitation in the Andaman Islands. *Man and Environment* 15(1): 73–81.
 1990b The problem of the origins of the Andamanese. *Bulletin of the Deccan College Post-Graduate and Research Institute* 49: 99–104.
 1994 Abandoned Onge encampments and their relevance in understanding the archaeological record in the Andaman Islands, in *Living Traditions: Studies in the Ethnoarchaeology of South Asia*: 235–263, ed. B. Allchin. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.
- FREEMAN, JOHN A. (SEAN)
 1993 A Preliminary Analysis of the Glass Artefacts Found on the Onkaparinga River Estuary. Graduate Diploma in Archaeology diss. Flinders University, Adelaide.
- GOULD, RICHARD A., DOROTHY A. KOSTER, AND ANN H. K. SONTZ
 1971 The lithic assemblage of the Western Desert Aborigines of Australia. *American Antiquity* 36: 149–169.
- HARRISON, RODNEY
 1996 It's the Way it Shatters that Matters: An Analysis of the Technology and Variability of Aboriginal Glass Artefacts in the Shark Bay and Swan Regions of Western Australia. Honors diss. University of Western Australia, Perth.
- KHATRI, A. P.
 1964 Rock paintings of Adamgarh (Central India) and their age. *Anthropos* 59: 759–769.
- LAPICQUE, L.
 1894 Ethnographie des îles Andaman. *Bulletin de la Société Anthropologie de Paris*, 3(May): 359–371.
- MALIK, S. C.
 1959 *Stone Age Industries of the Bombay and Satara Districts*. Baroda: Maharaja Sayajirao University of Baroda.

MAN, E. H.

- 1883 On the Aboriginal inhabitants of the Andaman Islands. *Journal of the Anthropological Institute of Great Britain and Ireland* 12: 69–175, 327–434.

MCCARTHY, F. D., AND F. A. DAVIDSON

- 1943 The elouera industry at Singleton, Hunter Valley, N.S.W. *Records of the Australian Museum* (Sydney) 21: 226–227.

PLOMLEY, N.J.B. (ED.)

- 1966 *Friendly Mission: The Tasmanian Journals and Papers of George Augustus Robinson 1829–1839*. Hobart: Tasmanian Historical Research Association.

RADCLIFFE BROWN, A. R.

- 1922 *The Andaman Islanders*. Cambridge: Cambridge University Press.

RHODES, DAVID, AND ROBYN STOCKS

- 1985 Excavations at Lake Condah Aboriginal Mission 1984–85. *Historic Environment* 4(4): 4–12.

TINDALE, N. B.

- 1941 A Tasmanian stone implement made from bottle glass. *Papers and Proceedings of the Royal Society of Tasmania*, pp. 1–2; plate 1.

ABSTRACT

Flaked glass artifacts from archaeological contexts in the Andaman Islands and several widely separated regions of Australia are described. The general problems in the identification of these kinds of artifacts are reviewed. They are considered also in the light of nineteenth century ethnohistoric records from both areas describing their use and manufacture. Similarities in their mode of manufacture are attributed to the deployment of the fundamental processes involved in flaking (knapping) behavior when similar new materials are available. KEYWORDS: hunter-gatherer technology, flaked glass, knapping, Andaman Islands, Australia.